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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

TUCKER, WESLEY J

ART UNIT

PAPER NUMBER

2624

DATE MAILED: 10/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/609,374	Applicant(s) BOBER ET AL.	
	Examiner Wes Tucker	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 July 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>10-1-03, 10-14-05</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), Annex IV, reads as follows:

Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." In this context, "functional descriptive material" consists of data structures and computer programs which impart functionality when employed as a computer component. (The definition of "data structure" is "a physical or logical relationship among data elements, designed to support specific data manipulation functions." The New IEEE Standard Dictionary of Electrical and Electronics Terms 308 (5th ed. 1993).) "Nonfunctional descriptive material" includes but is not limited to music, literary works and a compilation or mere arrangement of data.

When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized. Compare *In re Lowry*, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994) (claim to data structure stored on a computer readable medium that increases computer efficiency held statutory) and *Warmerdam*, 33 F.3d at 1360-61, 31 USPQ2d at 1759 (claim to computer having a specific data structure stored in memory held statutory product-by-process claim) with *Warmerdam*, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory).

In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See *Lowry*, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

Claim 11 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. Claim 11 defines a computer program embodying functional descriptive material. However, the claim does not define a computer-readable medium or memory and is thus non-statutory for that reason (i.e., "When functional descriptive material is recorded on some computer-readable medium

it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized" – Guidelines Annex IV). That is, the scope of the presently claimed computer program can range from paper on which the program is written, to a program simply contemplated and memorized by a person. The examiner suggests amending the claim to embody the program on "computer-readable medium" or equivalent in order to make the claim statutory. Any amendment to the claim should be commensurate with its corresponding disclosure.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 2 and 9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is unclear what the variable "n" is. An n-dimensional Hough space is claimed as well as an analyzing of m of the n variables, where m is less than n. Are the n from the n-dimensions and the n from the n variables the same? If they are, then doesn't n have to be 2 since Hough transforms are 2 dimensional? That would mean that m is one. Clearly this does not appear to be the case from the specification, but the use of the n variable in the claim renders the meaning ambiguous. Appropriate correction is required.

Regarding claim 2, the phrase "such as" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d). Appropriate correction is required.

Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 9 recites "generating a plurality of random reference image regions, for each reference image region performing a Hough transform ... combining the histograms from the reference images"

It is unclear if the random reference images regions are the same as the reference images. Reference image regions are very different than reference images. There is no antecedent basis for the mention of "the reference images." Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-7 and 9-15 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,629,989 to Osada.

With regard to claim 1, Osada discloses a method of analyzing an image comprising performing a Hough transform on points in an image space to an n -dimensional Hough space (Fig. 1, element 3), selecting points in the Hough space representing features in the image space (column 3, lines 25-45), and analyzing m of the n variables for the selected points, where m is less than n , to derive information about the features in the image space (column 3, lines 38-46).

Osada discloses a Hough transform processing method that uses information gathered from the Hough transform to determine significant edges. Osada discloses determining peaks from the histogram and thresholding the peaks in order to analyze less than all of the selected points. This is interpreted to read on analyzing m of the n selected point where m is less than n .

With regard to claim 2, Osada discloses a method as claimed in claim 1 comprising detecting points for the Hough transform using feature detecting means such as edge or corner detecting means or colour feature detecting means (Fig. 1, element 2)..

With regard to claim 3, Osada discloses a method as claimed in claims 1 and 2 wherein the analysis of the m variables for the selected points involves analysing relationships between the selected points (column 4, lines 42-47).

With regard to claim 4, Osada discloses a method as claimed in claim 1, wherein the Hough transform is for detecting lines (column 3, lines 30-37) and maps a point (x,y) in image space to points (r, θ) in Hough space (column 5, lines 35-36).

With regard to claim 5, Osada discloses a method as claimed in claim 4 wherein the analysis of the selected points involves analyzing the values of θ (column 5, lines 47-53).

With regard to claim 6, Osada discloses a method as claimed in claims 1, 2 and 4, wherein the step of selecting points in the Hough space involves identifying local peaks and comparing the local peaks with a threshold (column 4, lines 25-37).

With regard to claim 7, Osada discloses a method as claimed in claim 6 wherein the threshold is based on random reference images, preferably having similar statistical properties to the image being analyzed (column 4, lines 15-24). Osada discloses that the line detection and histogram division properties are set to "experimentally adequate values" which involves analyzing similar random images to derive such values.

With regard to claim 9, Osada discloses a method of generating a threshold for identifying features in a subject image using the Hough transform (Fig. 1, elements 2, 3 and 5) the method comprising generating a plurality of random reference image regions (Fig. 5), for each reference image region performing a Hough transform and deriving a histogram of accumulated values in Hough space (column 5, lines 8-17), combining the histograms for the reference images (column 3, lines 38-46 and column 7, lines 8-25), and using the combined histograms to derive a threshold (column 4, lines 5-37 and column 7, lines 8-17).

As can best be determined from the language of claim 9, Osada discloses the steps claimed. Osada discloses a threshold (column 4, lines 5-9) used in determining what pixels should be considered edge components. It should also be noted that this threshold is "experimentally adopted" from some base of images or image regions, and that the threshold is determined by the 3x3 filter kernel, which reads on image regions. The edge component image is then Hough transformed to give a representation that is used with a histogram of values in the Hough transform domain to determine maximum peaks in order to judge whether or not an edge truly exists and to what degree of certainty. This is determined using respective meshes or sub-arrays in the two dimensional image (column 4, lines 15-24). This also reads on image regions. The peaks are then determined from largest to less large and a threshold can also be set to determine what peaks are considered true peaks (column 7, lines 8-15).

With regard to claim 10, Osada discloses a method as claimed in claim 9 wherein the reference image regions have similar statistical properties to the subject image (column 3, lines 52-60 and column 4, lines 1-24). The discussion above applies. Image regions of the same image being examined will inherently have similar statistical properties especially within the 3x3 filter kernels and the meshes discloses by Osada.

With regard to claim 11, Osada discloses a computer program for executing a method as claimed in claims 2, 4, 9 and 10 (Fig. 1).

With regard to claim 12, Osada discloses a computer-readable medium storing a computer program as claimed in claim 11 (Fig. 1).

With regard to claim 13, Osada discloses an apparatus adapted to perform a method as claimed in claims 1, 2, 4 and 9 (column 1, lines 5-9).

With regard to claim 14, Osada discloses an apparatus as claimed in claim 13 comprising:

means for processing image signals (Fig. 1, element 1),

means for performing a Hough transform (Fig. 2, element 2),

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means for selecting points in the Hough space representing features in the image space (Fig. 1, element 4 and column 4, lines 15-38), and

means for analyzing m of the n variables for the selected points, where m is less than n , for information about the features in the image space (Fig. 1, element 5 and column 5, lines 12-45).

Osada discloses an apparatus that extracts image features such as edges, performs Hough transforming, selects peaks in the Hough transform domain as being image edge information, and then further limits the selection by choosing only the true peaks and therefore analyzing less than all of the image features in the Hough transform domain.

With regard to claim 15, Osada discloses an apparatus as claimed in claim 13 comprising image input means (Fig. 1, element 1).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 8 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of U.S. Patents 5,629,989 to Osada and 6,363,161 to Laumeyer et al.

With regard to claim 8, Osada discloses a method as claimed in claims 1, 2 and 4, but does not explicitly disclose wherein the analysis of the selected points is for identifying man-made structures and/or for distinguishing between urban/non-urban areas. Laumeyer discloses a Hough transform for enhancing image edge information similar to Osada, wherein the enhanced image edge information is used to identify road signs and the like in an urban driving environment (column 4, lines 45-67). Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to use enhanced edge information of Osada to help identify man-made structures such as road signs using a Hough transform as taught by Laumeyer.

With regard to claim 16, Osada discloses an apparatus as claimed in claim 13, but does not explicitly disclose comprising image display means. Image display means are exceedingly well known in the art for displaying image enhancements. Laumeyer discloses a video display that is used for identifying road signs using a Hough edge transformation enhancement (column 4, lines 45-67). Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to utilize a display device to display the edge enhanced information of Osada as taught by Laumeyer.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wes Tucker whose telephone number is 571-272-7427. The examiner can normally be reached on 9AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on 571-272-2214. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Wes Tucker

10-23-06


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